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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/850,162	05/08/2001	Tatsuyuki Saito	501.39868X00	9657

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EXAMINER

POMPEY, RON EVERETT

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 03/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/850,162	Applicant(s) SAITO ET AL.	
	Examiner Ron E Pompey	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17, 37, 39, 41-45, 47 and 49-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 37, 39, 41-45, 47 and 49-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1-20-04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-17, 37 and 39-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uozumi (US 6,261,953) in further view of Omura (US 6,028,362), Berman (US 5,893,756) and Chen (US 5,723,387).

Uozumi discloses the steps of:

forming a groove for wiring in a first insulating film formed on a semiconductor substrate;

successively forming a barrier layer and a conductive film over said first insulating film including the inside of said groove for wiring and removing said barrier layer and said conductive film from outside of said groove for wiring (2, 3 fig. 3A), thereby forming a wiring;

forming a cap conductive film (4, fig. 3A) on said wiring; and

forming a second insulating film over said cap conductive film and said first insulating film (11, fig. 3A) (col. 7, ln.23 – col. 8, ln. 12).

3. Uozumi fails to disclose the limitations of:

limitations the materials that are claimed for the cap conductive layer and forming plug to the semiconductor device;

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selective growth of cap layer on metal plug;
cleaning a surface of said first insulating film; and
cleaning of a substrate surface (fig. 3) after contaminants are formed on insulator after each CMP process.

a. Omura discloses the limitations of materials that are claimed for the cap conductive layer (60, fig. 15) and forming plug (52s, d, fig. 16) to the semiconductor device (col. 10, Ins. 40-62 and col. 13, ln. 65 – col. 14, ln. 61), besides other features of the claimed device. Therefore it would have been obvious to combine Omura with Uozumi, because those materials are good oxidation preventing materials and conductive plugs provide for electrical contact between devices;

b. Chen discloses the limitation of selective growth of cap layer (18, fig. 4E) on metal plug and cleaning (110, fig. 5) a surface of said first insulating film (col. 3, Ins. 52-60); and


c. Berman discloses the limitation for cleaning of a substrate surface (fig. 3) after contaminants are formed on insulator after each CMP process (col.4, Ins. 31- 40). Therefore, it would have been obvious to combine Omura and Uozumi with Chen and Berman, because selectively growing the cap layer would reduce process steps; and the cleaning steps after the selective deposition and CMP of the metals remove unwanted contaminants in the dielectric layer.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (571) 272-1680. The examiner can normally be reached on flex schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ron Pompey
Art Unit: 2812
February 19, 2004


John F. Niebling
Supervisory Patent Examiner
Technology Center 2800